A SIMPLE APPARATUS FOR CONTROLLING TEMPERATURES

(WITH ONE FIGURE)

In developing the control equipment for a humidity chamber in which it was desired to control temperatures over long periods of time, it was found essential to use a temperature control apparatus activated by an electric current taken from the ordinary lighting circuit. Troublesome failures with dry cells and storage batteries led to the construction

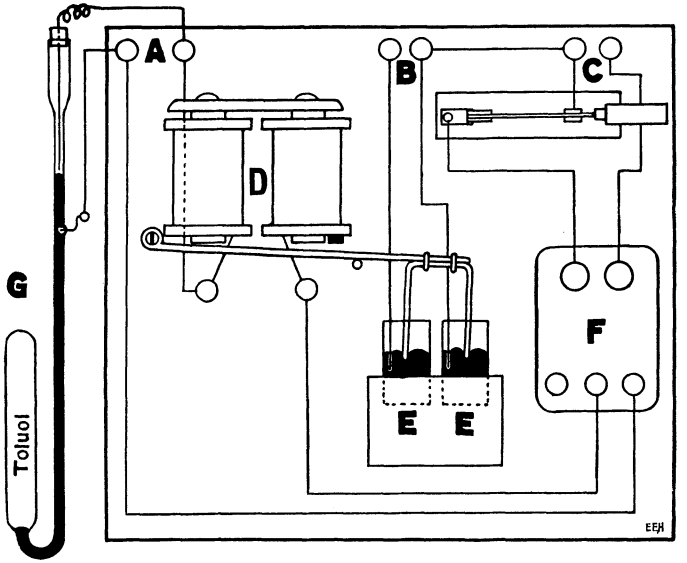

FIG. 1.—*A*, binding posts to which wires from thermostat tube (*G*) are attached; to left-hand binding post (*B*) is attached one of the wires leading from heating unit; *C*, binding posts to which wires from main lighting circuit are attached (one of the wires leading from heating unit is attached to right-hand post); *D*, "transformer bell" electro-magnetic coils wound for alternating current with bell and clapper removed (to extreme right of armature bar is attached a piece of U-shaped heavy copper wire); attached to lower part of right-hand magnet is a small piece of rubber cut from a rubber stopper, which projects far enough beyond magnet bar to eliminate most of the "chatter" or "buzz" when coils are operating; *E*, two glass vials (0.75×1.5 inches) partly filled with mercury, into which points of the U-shaped copper wire are immersed; wires leading from *B* are in contact with the mercury in vials; *F*, small, 3 volt, bell-ringing, alternating current transformer which furnishes 6, 8, or 14 volts as desired (here connected to furnish 8 volts, alternating current); *H*, small single-blade knife switch used to test action of coils at *D*; the asbestos-covered board upon which units *A* to *F* are mounted measures 9.5×11.5 inches, and is designed for wall attachment; use of transite board or other insulating material and mounting to reduce fire risks is recommended.

of the apparatus shown in fig. 1. This is a modification of a somewhat similar instrument secured through Dr. K. F. KELLERMAN, and used for some time at the Laboratory of Forest Pathology at Madison, Wisconsin, in controlling the temperature of a Bausch and Lomb incubator.

The main advantage of the apparatus here described lies in the fact that the same current (110 volts, 60 cycle, alternating) which passes through the heating units is used, after reducing the voltage to 6, 8, or 14 volts, to operate the relay (fig. 1*D*). The apparatus is simple, comparatively cheap, and when once set up and adjusted needs little attention. It will stand continuous service for long periods of time, and when used in connection with a toluol and mercury filled tube (fig. 1*G*) controls temperatures within a range of a quarter of a degree Fahrenheit.

When the mercury column in the tube (*G*) rises and contacts with the fine wire held by the cork, the coils at *D* draw the armature bar up to the poles of the magnet, the U-shaped wire is pulled free from the mercury at *E*, and the current supplying the heating unit is broken, thus shutting off the heat. A reversal of this action turns the heat on again.

At *E* the make and break of the current supplying the heat units is very positive in action. There is no arcing of the current between the mercury and the wire points, so long as the U-shaped wire is raised sufficiently above the mercury surface. The small voltage of the current passing through the mercury column in the tube (*G*) reduces the spark to a minimum, and for this reason little trouble is encountered with arcing, vaporizing of mercury, or clouding of the tube where contact is made between the fine wire and the mercury. A metal cap with adjusting screw carrying a fine platinum wire may be substituted for the cork and wire as shown.—ERNEST E. HUBERT, *Laboratory of Forest Pathology, Bureau of Plant Industry, in cooperation with the Forest Products Laboratory, Madison, Wisconsin.*